

US Pat. App. Ser. No. 09/997,168
Response to Office Action of 11/2/2005

ATTORNEY DOCKET: D1815-00053

REMARKS

This reply is responsive to the office action dated November 2, 2005.

The Office Action of November 2, 2005 has been carefully considered. Upon entry of this amendment, claims 1-4, 7-11 and 26-36 are pending. Claims 5, 6 and 12-25 have been cancelled; claims 1, 8, 11 and 26 have been amended, and new claims 30-36 have been added. Support for the new claims can be found in the application as filed. No new matter has been added, and the present application is believed to be in condition for allowance.

In the office action, the examiner:

- rejected claim 1 under 35 U.S.C. § 112, first paragraph;
- rejected claim 1 under 35 U.S.C. § 112, second paragraph;
- rejected claims 8, 26, 28 and 29 under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 4,550,051 to Spielau et al. ("the Spielau patent") in view of EP 0783960 to Westre ("the Westre reference");
- rejected claims 1-4, 9-11 and 27 under 35 U.S.C. § 103(a) as unpatentable over the Spielau patent in view of the Westre reference, and further in view of U.S. Patent No. 5,316,604 to Fell ("the Fell patent");
- rejected claims 1-4, 7 and 27 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,451,528 to Krause ("the Krause patent") in view of the Westre reference, and further in view of the Fell patent.

Rejections Under 35 U.S.C. § 112(1)

Claim 1 stands rejected under 35 U.S.C. § 112, first paragraph, because the specification allegedly does not provide enablement for a fiber-containing core layer comprising "poorly wetted or weakly bonded fibers." Claim 1 has been amended to delete this limitation, thus rendering this rejection moot.

Rejections Under 35 U.S.C. § 112(2)

Claim 1 stands rejected under 35 U.S.C. § 112, second paragraph, because the it is allegedly not clear from the claims or disclosure what is meant by the terms "poorly

US Pat. App. Ser. No. 09/997,168
Response to Office Action of 11/2/2005

ATTORNEY DOCKET: D1815-00053

wetted or weakly bonded." Claim 1 has been amended to delete this limitation, thus rendering this rejection moot.

Rejections Under 35 U.S.C. §103(a)

The Spielau Patent and Westre Reference

Claims 8, 26, 28 and 29 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the Spielau patent in view of the Westre reference.

Claim 8 has been amended to recite:

"... a multi-layered composite including:

- (i) a pair of resin-impregnated, fiber-containing layers . . .
- (ii) a fiber-containing core layer . . . said fiber-containing core layer sandwiched between said pair of resin-impregnated, fiber-containing layers . . .

wherein said fiber-containing core layer contains no matrix resin."

Claim 26 has been amended to recite:

". . . a multi-layered composite material . . . Include[ing]

- (i) a pair of resin-impregnated, fiber-containing layers . . .
- (ii) a fiber-containing core layer . . . sandwiched between said pair of resin-impregnated, fiber-containing layers . . .

wherein said fiber-containing core layer contains no matrix resin. . . ."

Claims 8 and 26 are patentable over the Spielau patent and the Westre reference, because those references, either alone or in combination, fail to disclose, teach or suggest "... a multi-layered composite [] including ... a pair of resin-impregnated, fiber-containing layers ... [and] a fiber-containing core layer ... sandwiched between said pair of resin-impregnated, fiber-containing layers ... wherein said fiber-containing core layer contains no matrix resin," as required by claims 8 and 26.

Rather, the Spielau patent discloses a laminate construction constituting a bonded multilayer composite of resin-impregnated outer plies with resin-impregnated

US Pat. App. Ser. No. 09/997,168
Response to Office Action of 11/2/2005

ATTORNEY DOCKET: D1815-00053

core plies. (See the Spielau patent, col. 2, lines 32-36; col. 6, lines 40-49.) The laminates are generally produced by saturating the fiber layer with impregnating solution. (See *id.*, col. 5, lines 50-51.) Flat textile forms which can be readily impregnated and carry a large amount of resin are preferred. (See *id.*, col. 6, lines 4-7.) Thus, the Spielau patent does not disclose, teach, or suggest providing a fiber-containing core layer containing no matrix resin, but rather discloses that its core layer is *impregnated* with resin.

Likewise, the Westre reference discloses hybrid laminates including layers of titanium alloy foil alternating with layers of a polymeric matrix with reinforcing fibers embedded therein. (See the Westre reference, col. 2, lines 46-50; col. 5, lines 29-34.) The preferred organic polymeric composite is formed of a prepreg in the form of continuous parallel reinforcing fibers coated with a resin. (See *id.*, col. 3, lines 20-23.) Each ply in the hybrid laminate includes an organic polymeric resin within which is embedded parallel reinforcing fibers. (See *id.*, col. 6, lines 45-51.) In the case of thermoplastic composites, it is preferred that the laminates are prepared by successively laying down long continuous strips of thermoplastic resin preimpregnated fibrous tapes by means of a thermoplastic application head. (See *id.*, col. 8, lines 1-6.) Thus, like the Spielau patent, the Westre reference discloses that its laminate layers are *impregnated* or *embedded* within the resin matrix, and thus does not disclose, teach or suggest providing a fiber-containing core layer containing no matrix resin.

Since the Spielau patent and the Westre reference, either alone or in combination, fail to disclose, teach or suggest all of the limitations of claims 8 and 26, applicant requests that the 35 U.S.C. § 103(a) rejection of claims 8 and 26 be withdrawn and that claims 8 and 26 be allowed. With respect to claims 28 and 29, which depend from claims 8 and 26, respectively, and which recite additional features of the invention, application requests that the 35 U.S.C. § 103(a) rejection of these claims be withdrawn and that these claims be allowed for the same reasons stated for claims 8 and 26 above.

US Pat. App. Ser. No. 09/997,168
Response to Office Action of 11/2/2005

ATTORNEY DOCKET: D1815-00053

The Spielau Patent, the Westre Reference and the Fell Patent

Claims 1-4, 9-11 and 27 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the Spielau patent in view of the Westre reference, and further in view of the Fell patent.

Claim 1 has been amended to recite:

"... a multi-layered composite ... including:

- (i) a pair of resin-impregnated, fiber-containing layers...
- (ii) a fiber-containing core layer ... sandwiched between said pair of resin-impregnated, fiber-containing layers ...

wherein said fiber-containing core layer contains no matrix resin."

Claim 8 has been amended to recite:

"... a multi-layered composite including:

- (i) a pair of resin-impregnated, fiber-containing layers ...
- (ii) a fiber-containing core layer ... sandwiched between said pair of resin-impregnated, fiber-containing layers ...

wherein said fiber-containing core layer contains no matrix resin."

Claims 1 and 8 are patentable over the Spielau patent and the Westre reference, because those references, either alone or in combination, fail to disclose, teach or suggest "... a multi-layered composite [] including ... a pair of resin-impregnated, fiber-containing layers ... [and] a fiber-containing core layer ... sandwiched between said pair of resin-impregnated, fiber-containing layers ... wherein said fiber-containing core layer contains no matrix resin," as required by claims 1 and 8.

As noted above, the Spielau patent discloses a laminate construction constituting a bonded multilayer composite of resin-impregnated outer plies with resin-impregnated core plies. (See the Spielau patent, col. 2, lines 32-36; col. 6, lines 40-49.) The

US Pat. App. Ser. No. 09/997,168
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ATTORNEY DOCKET: D1815-00053

laminates are generally produced by saturating the fiber layer with impregnating solution. (See *id.*, col. 5, lines 50-51.) Flat textile forms which can be readily impregnated and carry a large amount of resin are preferred. (See *id.*, col. 6, lines 4-7.) Thus, the Spielau patent does not disclose, teach, or suggest providing a fiber-containing core layer containing no matrix resin, but rather discloses the core layer is *impregnated* with resin.

Likewise, the Westre reference discloses hybrid laminates including layers of titanium alloy foil alternating with layers of a polymeric matrix with reinforcing fibers embedded therein. (See the Westre reference, col. 2, lines 46-50; col. 5, lines 29-34.) The preferred organic polymeric composite is formed of a prepreg in the form of continuous parallel reinforcing fibers coated with a resin to form a continuous strip. (See *id.*, col. 3, lines 20-23.) Each ply in the hybrid laminate includes an organic polymeric resin within which is embedded parallel reinforcing fibers. (See *id.*, col. 6, lines 45-51.) In the case of thermoplastic composites, it is preferred that the laminates are prepared by successively laying down long continuous strips of thermoplastic resin preimpregnated fibrous tapes by means of a thermoplastic application head. (See *id.*, col. 8, lines 1-6.) Thus, like the Spielau patent, the Westre reference discloses that its laminate layers are *impregnated* or *embedded* within the resin matrix, and thus does not disclose, teach or suggest providing a fiber-containing core layer containing no matrix resin.

The Fell patent does not cure these deficiencies, but rather discloses bonding of facing sheets to a thermoplastic honeycomb core or other thermoplastic core material by the use of a thermoplastic film. (See the Fell patent, col. 1, lines 16-21.)

Thus, the Spielau patent, the Westre reference, and the Fell patent, either alone or in combination, fail to disclose, teach or suggest all of the limitations of independent claims 1 and 8. Applicant, therefore, requests that the 35 U.S.C. § 103(a) rejection of claim 1 be withdrawn and that claim 1 be allowed. With respect to claims 2-4 and 27 - which depend from claim 1; and claims 9-11 - which depend from claim 8; applicant requests that the 35 U.S.C. § 103(a) rejections of these claims be withdrawn, and that these claims be allowed for the same reasons stated for claims 1 and 8 above.

US Pat. App. Ser. No. 09/997,168
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ATTORNEY DOCKET: D1815-00053

The Krause Patent, the Westre Reference and the Fell Patent

Claims 1-4, 7 and 27 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the Krause patent in view of the Westre reference, and further in view of the Fell patent.

Claim 1 has been amended to recite:

"... a multi-layered composite ... Including:

- (i) a pair of resin-impregnated, fiber-containing layers...
- (ii) a fiber-containing core layer ... sandwiched between said pair of resin-impregnated, fiber-containing layers ...

wherein said fiber-containing core layer contains no matrix resin."

Claim 1 is are patentable over the Krause patent, the Westre reference and the Fell patent because those references, either alone or in combination, fail to disclose, teach or suggest "... a multi-layered composite [] including ... a pair of resin-impregnated, fiber-containing layers ... [and] a fiber-containing core layer ... sandwiched between said pair of resin-impregnated, fiber-containing layers ... wherein said fiber-containing core layer contains no matrix resin," as required by claim 1.

Rather, the Krause patent discloses a reinforced article comprising a first web of a thermosetting resin incorporating glass fibers therein and having a surface stratum comprising a compatible thermosetting resin having graphite fibers in the resin matrix thereof. (See the Krause patent., col. 2, lines 36-44.) The Krause patent states:

"It is important that the resin employed in the glass fiber molding compound and the graphite fiber molding compound be compatible in order to form an *integral* resin matrix during the hot compression molding of the composite moldable assembly achieving thereby the requisite high-strength of the cured article. It is, accordingly, preferred to employ substantially the same polyester resin in both molding compounds to achieve *interdiffusion* at the surfaces of the graphite fiber compound and glass fiber compound during the molding operation."

(See *id.*, col. 3, lines 25-35.) (emphasis added). Thus, the Krause patent discloses

US Pat. App. Ser. No. 09/997,168
Response to Office Action of 11/2/2005

ATTORNEY DOCKET: D1815-00053

fibers that are dispersed/incorporated within the associated resin matrix, and thus fails to disclose teach or suggest providing a fiber-containing core layer containing no matrix resin.

As previously noted, the Westre reference discloses hybrid laminates including layers of titanium alloy foil alternating with layers of a polymeric matrix with reinforcing fibers embedded therein. (See the Westre reference, col. 2, lines 46-50; col. 5, lines 29-34.) The preferred organic polymeric composite is formed of a prepreg in the form of continuous parallel reinforcing fibers coated with a resin to form a continuous strip. (See *id.*, col. 3, lines 20-23.) Each ply in the hybrid laminate includes an organic polymeric resin within which is embedded parallel reinforcing fibers. (See *id.*, col. 6, lines 45-51.) In the case of thermoplastic composites, it is preferred that the laminates are prepared by successively laying down long continuous strips of thermoplastic resin preimpregnated fibrous tapes by means of a thermoplastic application head. (See *id.*, col. 8, lines 1-6.) Thus, the Westre reference discloses that its laminate layers are *impregnated or embedded* within the resin matrix, and thus does not disclose, teach or suggest providing a fiber-containing core layer having no matrix resin.

The Fell patent does not cure these deficiencies, but rather discloses bonding of facing sheets to a thermoplastic honeycomb core or other thermoplastic core material by the use of a thermoplastic film. (See the Fell patent, col. 1, lines 16-21.)

Thus, the Krause patent, the Westre reference, and the Fell patent, either alone or in combination, fail to disclose, teach or suggest all of the limitations of claim 1. Applicant, therefore, requests that the 35 U.S.C. § 103(a) rejection of claim 1 be withdrawn and that claim 1 be allowed. With respect to claims 2-4, 7 and 27, which depend from claim 1 and recite additional features of the invention, applicant requests that the 35 U.S.C. § 103(a) rejections of these claims be withdrawn, and that these claims be allowed, for the same reasons stated for claim 1 above.

US Pat. App. Ser. No. 09/997,168
Response to Office Action of 11/2/2005

ATTORNEY DOCKET: D1815-00053

New Claims 30-36


New dependent claims 30-36 have been added to depend from independent claims 1, 8 and 26. Claims 30 and 31 depend from independent claims 8 and 26, respectively, and recite "said fiber-containing core layer comprises aramid fibers." Support for these claims can be found on page 4, paragraph 14 of the specification as-filed. Claims 32-34 depend from independent claims 1, 8 and 26, and recite that "said composite material is formed by suspending the fiber-containing core layer in an injection mold, and molding the pair of resin-impregnated, fiber-containing layers around the fiber-containing core layer." Support for these claims can be found on page 7, paragraph 34 of the specification as-filed. Claims 35 and 36 depend from claims 8 and 26, and recite that "said fiber-containing core layer comprises loose fibers." Support for claims 35 and 36 can be found on page 8, paragraph 34 of the specification as filed.

New claims 30-36 are believed to be allowable for the same reasons as stated above in relation to independent claims 1, 8 and 26.

In view of the above, reconsideration of this application is respectfully requested and an early notice of allowance is earnestly solicited.

The Commissioner is hereby authorized to charge any required fees or credit any excess payment which may be associated with this communication to Duane Morris LLP Deposit Account 50-2061.

Respectfully submitted,

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